**Hook Diagrams and NAMING COMPOUNDS & MOLECULES**

Text: Page 64-65, Table 2 and Table 3.

Remember, **bonding capacity** is the ability of an atom of an element to chemically combine with other atoms. The periodic table can be used to determine the number of bonds an element can form.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group** | 1 | 2 | 13 | 14 | 15 | 16 | 17 | 18 |
| **# Bonds** | 1 | 2 | 3 | 4 | 3 | 2 | 1 | 0 |
| **Example**  **Element** | Na | Be | Al | C | P | O | Cl | Ne |

Elements in groups 3 – 12 do **not** follow these bonding patterns and the teacher will always tell you the number of bonds made by these elements.

**Bonding (hook) diagrams** show the bonding capacity and number of bonds. All bonds (hooks) must be filled. Each hook represents a bond the atom wants to make. Sodium makes one bond. Oxygen makes two bonds. For example: **Na2O**

O

Na

Na

**Rules for Naming Chemicals**

**1. Ionic Compounds – ionic bond, metal and non-metal**

a) First, metal name, then the non-metal name.

b) Change the ending of the non-metal to “ide”.

Example:

Na2O - sodium oxide

CaCl2 - calcium chloride

**2. Molecules – covalent bonds, non-metals or metalloids**

a) If both atoms are the same, the molecule name is the same as the element name. E.g. O2 (Oxygen)

b) Write the name of each non-metal.

c) For the first atom, add a prefix only if there is more than one atom.

For the second atom, add a prefix.

d) Change the ending of the second atom to “ide”.

Prefixes

1 - mono

2 - di

3 - tri

4 - tetra

5 - penta

Examples**:**

H2O - dihydrogen monoxide, or water

CO2 - carbon dioxide

**HOOK DIAGRAMS and NAMING COMPOUNDS & MOLECULES**

Text: Nelson Page 64-65, Table 2 and Table 3.

Remember **bonding capacity** is the ability of an atom of an element to chemically combine with other atoms. The periodic table can be used to determine the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an element can form.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Group** | 1 | 2 | 13 | 14 | 15 | 16 | 17 | 18 |
| **# Bonds** |  |  |  |  |  |  |  |  |
| **Example**  **Element** |  |  |  |  |  |  |  |  |

Elements in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the teacher will always tell you the number of bonds made by these elements.

Bonding (hook) diagrams show the bonding capacity and number of bonds. All bonds (hooks) must be filled.

Sodium (Na) makes one bond. Oxygen (O) makes 2 bonds. For example, **Na2O**

**Rules for Naming Chemicals**

**1. Ionic Compounds –** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) First, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Change the ending of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to “ide”

Example:

Na2O -

CaCl2 -

**2. Molecules –** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) If both atoms are the same, the molecule name is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the element name. E.g. O2 (Oxygen)

b) Write the name of each non-metal.

c) For the first atom, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_only if there is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For the second atom, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d) Change the ending of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to “ide”

Prefixes

1 - \_\_\_\_\_\_\_\_\_\_\_\_

2 - \_\_\_\_\_\_\_\_\_\_\_\_

3 - \_\_\_\_\_\_\_\_\_\_\_

4 - \_\_\_\_\_\_\_\_\_\_

5 - \_\_\_\_\_\_\_\_\_\_\_

Examples**:**

H2O - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or water

CO2 - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Now try drawing and naming the following chemicals:

CaCl2 - Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of bond? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Molecule or compound? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hook Diagram:

Al2O3 - Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Type of bond? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Molecule or compound? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hook Diagram:

Note: More naming rules will be learned in grade 10.**TWENTY QUESTIONS ABOUT…**chemical formulas and combining capacity!

|  |  |
| --- | --- |
| 1. What is the combining capacity for beryllium? |  |
| 2. What is the combining capacity for nitrogen? |  |
| 3. What is the combining capacity for sulphur? |  |
| 4. How many bonds can an atom of carbon make? |  |
| 5. What is the combining capacity of Ca? |  |
| 6. Name a metal with a combining capacity of 3. |  |
| 7. Name an element that does not bond with other elements. |  |
| 8. What is the combining capacity of B? |  |
| 9. Name three elements that have a combining capacity of 1. |  |
| 10. What is the chemical formula for magnesium chloride? |  |
| 11. What is the chemical formula for sodium fluoride? |  |
| 12. What is the chemical formula for aluminium oxide? |  |
| 13. Name three metals that have a combining capacity of 2. |  |
| 14. Which non-metal has a combining capacity of 1, O, F or S? |  |
| 15. Which non-metal has a combining capacity of 3, N, C or Ar? |  |
| 16. Which metal has a combining capacity of 2, K, Li or Mg? |  |
| 17. Which element has a combining capacity of 1, Ne, Ar or Na? |  |

**There are common names for some molecules. Please memorize these.**

NH3 - ammonia

H2O2 - hydrogen peroxide

H2O - water

CH4­ - methane

­O­3 - ozone

**Bonding Capacity and Naming Chemicals – Worksheet 1**

**Read the Nelson text p 64 – 65.**

**Do p 65 #1-3, 5 when you are finished this worksheet.**

Each hook represents a bond an atom wants to make. Draw hook diagrams for compounds formed from the following pairs of elements, write the formula, the name of the chemical and the type of bond. Remember all the “hooks” must be attached to another “hook”.

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Potassium and Oxygen** |  | Formula: |
| Combining Capacity of Potassium: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Oxygen: |

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Lithium and Fluorine** |  | formula: |
| Combining Capacity of Lithium: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Fluorine: |

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Calcium and Phosphorus** |  | formula: |
| Combining Capacity of Calcium: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Phosphorus: |

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **Aluminum and Sulphur** |  | formula: |
| Combining Capacity of Aluminum: | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of Sulphur: |

Make your own:

|  |  |  |
| --- | --- | --- |
|  | **Hook Diagram** |  |
| **\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_** |  | Formula: |
| Combining Capacity of \_\_\_\_\_\_\_\_\_\_ | Name:  Type of Bond?  Covalent or Ionic |
| Combining Capacity of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Bonding Capacity and Naming Chemicals – Worksheet 2**

Draw ball and hook diagrams for each molecule.

Name the chemical. If the chemical has covalent bonds circle **molecule** or circle **compound** for ionic bonds.

|  |  |  |
| --- | --- | --- |
| NaF  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | H2O  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | Na2O  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? |
| CaCl2  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | AlCl3  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | CF4  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? |
| K2S  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | Mg3P2  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? | B2O3  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Molecule or compound ? |

**Bonding Capacity and Naming Chemicals- Extra 1**

For the following pairs of elements, predict the chemical formula for the resulting compound, and draw hook diagrams. Write the name of the resulting compound. The combining capacities are in brackets for some metals when you can not easily determine the combining capacity.

|  |
| --- |
| **Copper (1) and Chlorine:**  Chemical formula:  Name : |
| **Copper (2) and Iodine:**  Chemical formula:  Name : |
| **Calcium and Chlorine:**  Chemical formula:  Name : |
| **Calcium and Oxygen:**  Chemical formula:  Name : |
| **Silver (1) and Chlorine:**  Chemical formula:  Name : |